



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,952	06/12/2006	Sho Kumagai	Q92253	3190
23373	7590	09/04/2008	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			LANGMAN, JONATHAN C	
ART UNIT	PAPER NUMBER		1794	
MAIL DATE	DELIVERY MODE			
09/04/2008	PAPER			

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/561,952	<b>Applicant(s)</b> KUMAGAI ET AL.
	<b>Examiner</b> JONATHAN C. LANGMAN	<b>Art Unit</b> 1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 12 June 2006.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) 4-7 is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-3 and 8 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date 12/22/2005

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_

5) Notice of Informal Patent Application

6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-3 and 8, drawn to an article.

Group II, claim(s) 4-7, drawn to a method.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

- (1) The common feature of forming a CVD coating of Sic on a sintered sic body comprising nonmetallic sintering aids cannot qualify as a special technical feature as it does not provide a contribution over the prior art because it is disclosed by Kazutoshi et al. (JP 2003-282664) and Otsuki et al. (US 6,090,733), or Lu et al (US (5,904,778), Otsuki et al. (US .6,090,733), and Inaba et al. (US 5,937,316) (see the rejections set forth below).

In light of the rejections set forth below the reference(s) specifically suggests using the common elements as claimed.

During a telephone conversation with Steven Gruskin on August 18, 2008 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-3 and 8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 4-7 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product

claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the surface" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "the chemical vapor deposition" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 2 recites the limitation "the whole perimeter" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 2 recites the limitation "the side surface" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 3 and 8 are rejected for being dependent upon base rejected claims.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazutoshi et al. (JP 2003-282664) in view of Otsuki et al. (US 6,090,733).

Regarding claims 1 and 8, Kazutoshi teach a SiC dummy wafer used as a monitor wafer (abstract). The SiC wafer comprises a 100 micron SiC film deposited by CVD ([0018]). The substrate which the film is deposited on comprises sintered compacts of Sic ([0008]). The surface of the wafer was polished resulting in a surface roughness Ra of 0.5 nm ([0009]). Kazutoshi et al. do not teach using non metallic sintering aids in the sintered SiC compact. However it is well known in the art and even further taught by Otsuki et al. that sintered silicon carbide compacts may be made by sintering silicon carbide powder along with non metallic sintering aids (abstract). It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use non metallic sintering aids in the sintered compacts of Kazutoshi et al., as is known in the art and further taught by Otsuki, because sintering

aids, do just that, aid in sintering the compact and help the compact to become more dense and less porous, resulting in a superior wafer. And furthermore, Otsuki teaches that by using nonmetallic sintering aids in SiC as opposed to using metallic sintering aids, the resultant Sic will have less contamination (col. 3, lines 12-18).

Regarding claim 3, although Kazutoshi et al. teaches a thickness of about 100 microns and not a thickness of 20-70 microns, however it is well within the grasp and knowledge of a routineer in the art to adjust the thickness for a case to case basis. Thinner coatings as long as they achieve the same purpose, would require less production time and result in cheaper wafers. It would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the thickness to values, including those presently claimed, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al (US 5,904,778) in view of Otsuki et al. (US 6,090,733) in view of Inaba et al. (US 5,937,316).

Lu teaches a bulk SiC which is inexpensive and a strong support structure used for a substrate where CVD SiC is deposited. The CVD SiC has advantages in plasma processing and may be tailored for particular uses (abstract). The Sic body is made by sintering a mixed powder of silicon carbide, and a sintering aid (col. 3, lines 59-col. 4, lines 14). Lu teaches that the sintering aid is pliable but does not mention that it is

nonmetallic. Non metallic sintering aids are known in the art of forming sintered SiC compacts and are obvious to use in Lu, because of the sintering aids being functional equivalents. See at least the abstract of Otsuki et al. (6,090,733). Furthermore, Otsuki teaches that by using nonmetallic sintering aids in SiC as opposed to using metallic sintering aids, the resultant SiC will have less contamination (col. 3, lines 12-18). Lu et al. does not mention using the composite article as a dummy wafer. However, this limitation is an intended use. The articles of Lu and the instantly claimed article are substantially the same and therefore it is the examiners position that the article of Lu can function as a dummy wafer. Furthermore Inaba et al. teach "Since silicon carbide excels in heat resistance, the frequency of its use is increasing for applications that include, for example, a susceptor, a wafer holder, a thermal uniformity plate, a thermal uniformity ring, and a dummy wafer. To obtain silicon carbide with purity levels equivalent to that of quartz glass to be used for such applications, generally a CVD-SiC film (CVD-SiC film silicon carbide film formed by the method of Chemical Vapor Deposition) is formed on the surface of an SiC substrate" (emphasis added) (col. 1 lines 10-20). Therefore it would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the article of Lu et al. as a dummy wafer since it has been shown in the art that these articles are used as dummy wafers.

Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al (US (5,904,778), Otsuki et al. (US .6,090,733), and Inaba et al. (US 5,937,316)

as applied above to claim 1, in view of Ebata et al. (WO 02/071473) and further in view of Horiuchi et al. (US 2002/0151428).

Lu, Otsuki, and Inaba et al. teach a dummy wafer comprising a CVD Sic film, deposited on a SiC sintered composite. They are silent to the dummy wafer being a monitor wafer, the thickness of the film being in the instantly claimed range, and the surface roughness. Ebata teaches using CVD SiC as a monitor wafer. The wafer is polished to a surface roughness of 0.08 nms or less which falls within the applicants claimed range (abstract). Although Ebata teaches standalone CVD SiC, it is important to realize that this teaching is a teaching reference for using SiC as a monitor wafer. In order to do so Ebata teaches the necessity of polishing and treating the surface of CVD SiC to a RMS of less than 10 nm. It would have been obvious to a routineer in the art to polish the surface of the CVD SiC film of Lu, Otsuki and Inaba et al. in order to utilize the dummy wafer as a monitor wafer, as is known in the art. Further in regards to claim 8, the recitation in the claims that the dummy wafer is "for a monitor wafer" is merely an intended use. Applicants attention is drawn to MPEP 2111.02 which states that intended use statements must be evaluated to determine whether the intended use results in a structural difference between the claimed invention and the prior art. Only if such structural difference exists, does the recitation serve to limit the claim. If the prior art structure is capable of performing the intended use, then it meets the claim.

It is the examiner's position that the intended use recited in the present claims does not result in a structural difference between the presently claimed invention and the prior art and further that the prior art structure is capable of performing the intended

use. Given that Lu, Otsuki, and Inaba disclose a dummy wafer as presently claimed, it is clear that the dummy wafer of Lu, Otsuki, and Inaba would be capable of performing the intended use, i.e. a monitor wafer, presently claimed as required in the above cited portion of the MPEP.

Lu, Otsuki, Inaba and Ebata, do not teach the instant thickness of 20 to 70 microns. Horiuchi et al. teach a composite dummy wafer comprising ([0002]) a CVD SiC film formed on a Si/SiC composite substrate ([0068]). The film when used as a dummy wafer undergoes process steps and is subsequently cleaned and acid washed ([0021]). Horiuchi teaches that the CVD SiC film is preferably 30 microns or more in order to have a sufficient corrosion resistance when washed in acid ([0065]). It would have been obvious to form the film of Lu, Otsuki, Inaba, and Ebata, with a thickness of 30 microns or more in order to provide protection against known semiconductor processing steps such as acid washing.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al (US (5,904,778), Otsuki et al. (US .6,090,733), and Inaba et al. (US 5,937,316) as applied above to claim 1.

Lu, Otsuki, and Inaba do not specifically teach coating the whole perimeter of the surface of the dummy wafer including the side surface of the dummy wafer. However it would have been obvious to a person having ordinary skill in the art at the time the present invention was made to coat all sides of the sintered SiC material because sintered SiC will inherently and expectedly have open pores. During semiconductor

processing steps, these pores would offer sites for contamination and lower the production lives of these dummy/monitor wafers. Sintered SiC also has high contents of impurities as is known in the art, much higher concentrations than CVD Sic. By coating the entire sintered substrate with CVD SiC, one would obtain increased resistance to known chemicals and atmospheres of semiconductor manufacturing apparatuses by coating of the open pores of sintered SiC, and furthermore would increase productivity by producing higher numbers of non contaminated wafers when CVD SiC coated dummy wafers are used alongside production wafers in manufacturing.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kazutoshi et al. (JP 2003-282664) and Otsuki et al. (US 6,090,733), as applied above to claims 1, 3 , and 8.

Kazutoshi et al. and Otsuki et al. do not specifically teach coating the whole perimeter of the surface of the dummy wafer including the side surface of the dummy wafer. However it would have been obvious to a person having ordinary skill in the art at the time the present invention was made to coat all sides of the sintered SiC material because sintered SiC will inherently and expectedly have open pores. During semiconductor processing steps, these pores would offer sites for contamination and lower the production lives of these dummy/monitor wafers. Sintered SiC also has high contents of impurities as is known in the art, much higher concentrations than CVD Sic. By coating the entire sintered substrate with CVD SiC, one would obtain increased resistance to known chemicals and atmospheres of semiconductor manufacturing

apparatuses by coating of the open pores of sintered Sic, and furthermore would increase productivity by producing higher numbers of non contaminated wafers when CVD SiC coated dummy wafers are used alongside production wafers in manufacturing.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN C. LANGMAN whose telephone number is (571)272-4811. The examiner can normally be reached on Mon-Thurs 8:00 am - 6:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCL  
/Jonathan C Langman/  
Examiner, Art Unit 1794

/Callie E. Shosho/  
Supervisory Patent Examiner, Art Unit 1794